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ART UNIT PAPER NUMBER

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7

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/927,118

Applicant(s)

PIERCE ET AL.

Examiner

Alysa N Brautigam

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-58 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-58 is/are rejected.
- 7) ☒ Claim(s) 29 and 54 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Objections*

1. Claims 29 and 54 are objected to because of the following informalities: Claims 29 and 54 refers back to the "method of Claim 21." Claim 21 discloses a system not a method. Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). It is uncertain what the term "at least partially equirectangular" in Claim 10 is meant to be defined as since the accepted definition of rectangular is "having four right angles" or "having a set of mutually perpendicular axes; meeting at right angles" and the term equirectangular could be presumed to mean the combination of both of those

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definitions whereas the preceding adjective "partially" implies it is not rectangular at all.

The term is indefinite because the specification does not clearly redefine the term.

3. Claims 21, 22, 29 and 54 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Specifically, Claim 21 discloses the first combined image representing "at least about 180 degrees of a scene," Claim 22 discloses the first combined image representing "at least about 300 degrees of a scene," and Claim 54 discloses "said moving stereoscopic image represents about 360 degrees of a scene" (see rejection contained hereinbelow regarding Claim 54 and the lack of proper antecedent basis for the reference to moving stereoscopic image). Claim 19, upon which these claims are dependent, defines the first combined image as that achieved by "combining a first image captured with said first image capture device with a second image captured with said second image capture device." The applicant's specification states the "horizontal field of view of the image capture unit, which is preferably between 1 and 80 degrees, more preferably between 30 and 60 degrees, and 53 degrees in the preferred embodiment" (page 7, lines 7-9). With that being the case, the maximum possible field of view when combining two images with no overlap would be 160 ( $80 + 80$ ) degrees and, in the preferred embodiment, would only be 106 ( $53 + 53$ ) degrees with no overlapping of images. Therefore, given the details provided in the specification, it is not possible to combine two images and achieve a field of view of "at least about 180

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degrees" nor a field of view of "at least about 300 degrees" nor a field of view "about 360 degrees of a scene." Claim 29 is similarly rejected as it is dependent upon Claim 21.

4. Claim 41, 42-46 and 57-58 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Specifically, the applicant claims an imaging system wherein the processing unit receives a first portion of an image to "provide a first stereoscopic image" and a second portion of said image to "provide a second stereoscopic image." There is insufficient detail in the applicant's disclosure to suggest how one would be able to generate a stereoscopic image from a single image. It is possible the applicant meant the claim to read similarly to Claim 30, that is a "processing unit operationally coupled to the image capture device to receive a first portion of said image and combine it with a second image to provide a first stereoscopic image, and to receive a second portion of said image and combine it with a third image to provide a second stereoscopic image." Claims 42-46 and 57-58 are similarly rejected as being dependent upon a rejected base claim.

5. Claim 28 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, Claim 28 recites the limitation "said stereoscopic motion image" in line 1 in reference to the method of Claim 26. Claim 26, nor any of the

preceding claims upon which it is based contains reference to a "stereoscopic motion image." Therefore, there is insufficient antecedent basis for this limitation in the claim. For the purpose of further review, it will be assumed the applicant meant the claim to read "stereoscopic image."

6. Claims 47- 54 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. Claim 47 recites the limitation "stereoscopic image" in line 1 in reference to the imaging system of Claim 7. Claim 7 contains reference to a first image and a second image neither of which are defined as stereoscopic. Therefore, there is insufficient antecedent basis for this limitation in the claim. For the purpose of further review, it will be assumed the applicant meant the claim to read "at least one of a first or second combined image" as disclosed in Claim 1.

8. Claim 48 recites the limitation "stereoscopic image" in line 1 in reference to the imaging system of Claim 8. Claim 8 contains reference to a first image and a second image neither of which are defined as stereoscopic. Therefore, there is insufficient antecedent basis for this limitation in the claim. For the purpose of further review, it will be assumed the applicant meant the claim to read "at least one of a first or second combined image" as disclosed in Claim 1.

9. Claim 49 recites the limitation "moving stereoscopic image" in line 1 in reference to the imaging system of Claim 9. Claim 9 contains references to a first image and a second image neither of which is defined as a stereoscopic image nor is either one

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defined as a moving image. Therefore, there is insufficient antecedent basis for this limitation in the claim. For the purpose of further review, it will be assumed the applicant meant the claim to read "at least one of a first or second combined image" as disclosed in Claim 1.

10. Claim 50 recites the limitation "stereoscopic, panoramic image" in line 1 in reference to the imaging system of Claim 10. Claim 10 contains reference to a first combined image and a second combined image neither of which is defined as both stereoscopic and panoramic. Therefore, there is insufficient antecedent basis for this limitation in the claim. For the purpose of further review, it will be assumed the applicant meant the claim to read "at least one of a first or second combined image" as disclosed in Claim 1.

11. Claim 51 recites the limitation "moving stereoscopic, panoramic image" in line 1 in reference to the imaging system of Claim 11. Claim 11 contains reference to a second image and a third image neither of which is defined as moving, stereoscopic or panoramic. Therefore, there is insufficient antecedent basis for this limitation in the claim. For the purpose of further review, it will be assumed the applicant meant the claim to read "at least one of a first or second combined image" as disclosed in Claim 1.

12. Claim 52 recites the limitation "panoramic stereoscopic image" in line 1 in reference to the imaging system of Claim 14. Claim 14 contains reference to a first combined image, a second combined image, first combined panoramic image, a second combined panoramic image but contains no reference to an image which is stereoscopic. Therefore, there is insufficient antecedent basis for this limitation in the

claim. For the purpose of further review, it will be assumed the applicant meant the claim to read "first combined panoramic image and second combined panoramic image."

13. Claim 53 recites the limitation "said panoramic stereoscopic image" in line 1 in reference to the imaging system of Claim 15. Claim 15 contains reference to a first combined image, a second combined image, first combined panoramic image, a second combined panoramic image but contains no reference to an image which is stereoscopic. Therefore, there is insufficient antecedent basis for this limitation in the claim. For the purpose of further review, it will be assumed the applicant meant the claim to read "first combined panoramic image and second combined panoramic image."

14. Claim 54 recites the limitation "said moving stereoscopic image" in line 1 in reference to the imaging system of Claim 21. Claim 21 contains no reference to a moving stereoscopic image. Therefore, there is insufficient antecedent basis for this limitation in the claim. For the purpose of further review, it will be assumed the applicant meant the claim to read "said first combined image."

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.



15. Claims 1-15, 18, 47-49, and 50-53 are rejected under 35 U.S.C. 102(b) as being anticipated by McCutchen (5,023,725).

16. In regards to Claim 1, McCutchen discloses an imaging system comprised of:

- a first image capture device, a second image capture device, a third image capture device (Figures 2 shows six separate image capture device planes; Figure 20, column 14, lines 22-25, and column 21, lines 1-13 disclose twelve image capture devices – or camera modules – linked together to cover an entire spherical field of view; Figure 21 and column 21, lines 14-33 disclose the use of six image capture devices – or camera modules – linked together to cover an entire hemisphere)
- means for combining at least a first portion of a first image captured with said first image capture device with a portion of a second image captured with said second image capture device, to produce a first combined image (Figure 24, column 21, lines 51-68 and column 22, lines 1-29 disclose the use of electro-optical lenses to extract three screens within one image capture device where each screen covers the area equivalent to one section of a dodecahedrically divided sphere. It is further disclosed that one-third, e.g. Item 194 of Figure 24, of the captured image is overlapping a first adjacent image and another one-third, e.g. Item 195 of Figure 24, is overlapping a second adjacent image. In the disclosed invention, each image capture device is capable of extracting

three screens and then overlapping one-third with a first adjacent image and another one-third with a second adjacent image.)

- means for combining at least a second portion of said first image with at least a portion of a third image captured with said third image capture device to produce a second combined image (Figure 24, column 21, lines 51-68 and column 22, lines 1-29 disclose the use of electro-optical lenses to extract three screens within one image capture device where each screen covers the area equivalent to one section of a dodecahedrically divided sphere. It is further disclosed that one-third, e.g. Item 194 of Figure 24, of the captured image is overlapping a first adjacent image and another one-third, e.g. Item 195 of Figure 24, is overlapping a second adjacent image. In the disclosed invention, each image capture device is capable of extracting three screens and then overlapping one-third with a first adjacent image and another one-third with a second adjacent image.)
- said second combined image does not comprise a majority of said first portion of said first image (Figure 24, column 21, lines 51-68 and column 22, lines 1-29 disclose a device where the second combined image is overlapped by a portion of a first image, e.g. Item 195 of Figure 24, and the first portion of said first image is exemplified by Item 194 of Figure 24 wherein Item 195 does not comprise a majority of Item 194)

17. In regards to Claim 2, McCutchen discloses the image capture device of Claim 1 wherein said first image capture device, said second image capture device, and said third image capture device are provided arcuately relative to one another, no closer than about five degrees apart. (Figures 1 and 2 disclose a sphere divided into twelve, pentagonally-shaped planes where, in the recessed region defined by the planar elements created by the points of the pentagon, lies an image capture device. Figure 3 and column 11, lines 21-51 disclose the image capture devices being set arcuately relative to one another within the spherical system. Figure 1, Figure 33, column 25, lines 60-68 and column 26, lines 1-13 disclose the radial distance as fifty-eight degrees which is no closer than five degrees apart.)

18. In regards to Claim 3, McCutchen discloses the image capture device of Claim 1 wherein said first image capture device, said second image capture device, and said third image capture device are provided arcuately relative to one another, no closer than about ten degrees apart. (Figures 1 and 2 disclose a sphere divided into twelve, pentagon-shaped planes where, in the recessed region defined by the planar elements created by the points of the pentagon, lies an image capture device. Figure 3 and column 11, lines 21-51 disclose the image capture devices being set arcuately relative to one another within the spherical system. Figure 1, Figure 33, column 25, lines 60-68 and column 26, lines 1-13 disclose the radial distance as fifty-eight degrees which is no closer than ten degrees apart.)

19. In regards to Claim 4, McCutchen discloses the image capture device of Claim 1 wherein said first image capture device, said second image capture device, and said

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third image capture device are provided arcuately relative to one another, no closer, than about forty-five degrees apart. (Figures 1 and 2 disclose a sphere divided into twelve, pentagon-shaped planes where, in the recessed region defined by the planar elements created by the points of the pentagon, lies an image capture device. Figure 3 and column 11, lines 21-51 disclose the image capture devices being set arcuately relative to one another within the spherical system. Figure 1, Figure 33, column 25, lines 60-68 and column 26, lines 1-13 disclose the radial distance as fifty-eight degrees which is no closer than forty-five degrees apart.)

20. In regards to Claim 5, McCutchen discloses the image capture device of Claim 1 wherein said first image capture device, said second image capture device, and said third image capture device are provided arcuately relative to one another, no closer than about twenty degrees apart. (Figures 1 and 2 disclose a sphere divided into twelve, pentagon-shaped planes where, in the recessed region defined by the planar elements created by the points of the pentagon, lies an image capture device. Figure 3 and column 11, lines 21-51 disclose the image capture devices being set arcuately relative to one another within the spherical system. Figure 1, Figure 33, column 25, lines 60-68 and column 26, lines 1-13 disclose radial distance as fifty-eight degrees which is no closer than twenty degrees apart.)

21. In regards to Claim 6, McCutchen discloses the imaging system of Claim 1 wherein said first portion of said first image is greater than about twenty percent of said first image, and wherein said portion of said second image is greater than about twenty percent of said second image. (Figure 24, column 21, lines 51-68 and column 22, lines

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1-29 disclose the use of electro-optical lenses to extract three screens within one image capture device wherein each screen covers the area equivalent to one section of a dodecahedrically divided sphere. It is further disclosed that one-third, e.g. Item 194 of Figure 24, or an amount greater than twenty percent, of the captured image is overlapping a first adjacent image and another one-third, e.g. Item 195 of Figure 24, or an amount greater than twenty percent, is overlapping a second adjacent image. In other words, the second image has a portion which is overlapped by a portion of the first image and this overlapped portion is one-third, or an amount greater than twenty percent, of the second image.)

22. In regards to Claim 7, McCutchen discloses the imaging system of Claim 6, wherein said first portion of said first image is less than about eighty percent of said first image, and wherein said portion of said second image is less than about eighty percent of said second image. (Figure 24, column 21, lines 51-68 and column 22, lines 1-29 disclose the use of electro-optical lenses to extract three screens within one image capture device wherein each screen covers the area equivalent to one section of a dodecahedrically divided sphere. It is further disclosed that one-third, or an amount less than eighty percent, of the captured image is overlapping a first adjacent image and another one-third, or an amount less than eighty percent, is overlapping a second adjacent image. The second image has a portion which is overlapped by a portion of the first image and this overlapped portion is one-third, or an amount less than eighty percent, of the second image.)

23. In regards to Claim 8, McCutchen discloses the imaging system of Claim 1, wherein said first portion of said first image is less than about eighty percent of said first image, and wherein said portion of said second image is less than about eighty percent of said second image. (Figure 24, column 21, lines 51-68 and column 22, lines 1-29 disclose the use of electro-optical lenses to extract three screens within one image capture device wherein each screen covers the area equivalent to one section of a dodecahedrically divided sphere. It is further disclosed that one-third, or an amount less than eighty percent, of the captured image is overlapping a first adjacent image and another one-third, or an amount less than eighty percent, is overlapping a second adjacent image. The second image has a portion which is overlapped by a portion of the first image and this overlapped portion is one-third, or an amount less than eighty percent, of the second image.)

24. In regards to Claim 9, McCutchen discloses the imaging system of Claim 1, wherein said first image and said second image are substantially rectilinear, that is having a shape characterized by straight sides. (Figure 10 and column 17, lines 2-4; Figure 11 and column 17, lines 33-34; Figure 12 and column 17, line 43; Figure 14 and column 18, lines 45-53; Figure 24 and column 21, lines 51-64 all disclose the images being substantially rectilinear in shape.)

25. In regards to Claim 10, McCutchen discloses the imaging system of Claim 1, wherein said first combined image and said second combined image are at least partially equirectangular, as best as understood in view of the 35 U.S.C. 112, second

paragraph rejection above. (Column 26, lines 25-30 disclose an alternate embodiment where the screen images have a shape closer to the conventional rectangular screens.)

26. In regards to Claim 11, McCutchen discloses the imaging system of Claim 1, wherein said second image and said third image are digital images. (Column 14, lines 45-46, column 15, lines 8-12, and column 28, lines 60-63 disclose a system which may be either digital or analog but, in the preferred embodiment, is a system wherein all of the images are digital images.)

27. In regards to Claim 12, McCutchen discloses the imaging system of Claim 1, further comprising means for sequentially displaying (column 15, lines 13-69 and column 16, lines 1-36 disclose the ability of the system to sequentially display individual images using a raster scanning technique) a plurality of combined images (column 16, lines 33-36 disclose the ability of the system to combine images for display) in a manner which conveys motion (column 10, lines 55-66 disclose the system being used for "motion picture film").

28. In regards to Claim 13, McCutchen discloses the imaging system of Claim 1, comprising a means for displaying said first combined image and said second combined image stereoscopically (column 20, lines 65-69 disclose the use of overlapping images wherein the "camera would therefore be capable of realistic, nearly omnidirectional stereoscopic photography").

29. In regards to Claim 14, McCutchen discloses the imaging system of Claim 1, further comprising means for combining said first combined image with a sufficient plurality of images to produce a first combined panoramic image, representing at least

about 90 degrees of a scene, and combining said second combined image with a sufficient plurality of images to produce a second combined panoramic image, representing about 90 degrees of a scene (Figure 24, column 21, lines 51-68 and column 22, lines 1-29 disclose the use of electro-optical lenses to extract three screens within each of five image capture devices wherein each screen covers the area equivalent to one pentagon-shaped section of a dodecahedrically divided sphere. It is further disclosed that one-third, e.g. Item 194 of Figure 24, of the captured image is overlapping a first adjacent image and another one-third, e.g. Item 195 of Figure 24, is overlapping a second adjacent image. In the disclosed invention, each image capture device is capable of extracting three screens and then overlapping one-third with a first adjacent image and another one-third with a second adjacent image to provide a plurality of combined panoramic images, the combined images providing a complete hemispherical image; Figure 25 and column 22, lines 32-34 where a single image capture device is disclosed as having a field of view of at least 152 degrees and the overlapped images would have a field of view representing about 90 degrees of a scene; Figure 19 and column 20, lines 62-68 further state the system " would therefore be capable of realistic, nearly omnidirectional stereoscopic" image generation), and means for displaying said first combined panoramic image and said second combined panoramic image in a manner which produces a stereoscopic, panoramic effect (Figure 31 and column 19, lines 40-65 disclose a projection module able to display a field of view as wide as that of their respective camera modules and to overlap images in such a way as to achieve stereoscopic, panoramic effects).



30. In regards to Claim 15, McCutchen discloses the imaging system of Claim 1, further comprising a means for combining said first combined image with a sufficient plurality of images to produce a first combined panoramic image, representing at least about 180 degrees of a scene, and combining said second combined image with a sufficient plurality of images to produce a second combined panoramic image, representing about 180 degrees of a scene (Figure 24, column 21, lines 51-68 and column 22, lines 1-29 disclose the use of electro-optical lenses to extract three screens within each one of five image capture devices wherein each screen covers the area equivalent to one pentagon-shaped section of a dodecahedrically divided sphere. It is further disclosed that one-third, e.g. Item 194 of Figure 24, of the captured image is overlapping a first adjacent image and another one-third, e.g. Item 195 of Figure 24, is overlapping a second adjacent image. In the disclosed invention, each image capture device is capable of extracting three screens and then overlapping one-third with a first adjacent image and another one-third with a second adjacent image to provide a plurality of combined panoramic images, the combined images providing a complete hemispherical image, representing about 180 degrees of a scene; Figure 19 and column 20, lines 62-68 further state the system " would therefore be capable of realistic, nearly omnidirectional stereoscopic" image generation), and means for displaying said first combined panoramic image and said second combined panoramic image in a manner which produces a stereoscopic, panoramic effect (Figure 31 and column 19, lines 40-65 disclose the projection modules able to display a field of view as wide as

that of their respective camera modules and to overlap images in such a way as to achieve stereoscopic, panoramic effects).

31. In regards to Claim 18, McCutchen discloses the imaging system of Claim 1, further combining said first combined image and said second combined image with a digital image, to produce a stereoscopic image within said digital image. (Column 14, lines 45-46, column 15, lines 8-12, and column 28, lines 60-63 disclose a system which may be either digital or analog but, in the preferred embodiment, is a system wherein all of the images are digital images; column 20, lines 62-68 discloses that, through the use of electro-optical lenses to create overlapping images, the system "would therefore be capable of realistic, nearly omnidirectional stereoscopic" image generation.)

32. In regards to Claims 47, as best as understood in view of the 35 U.S.C. 112 second paragraph rejection above, McCutchen discloses the imaging system of Claims 7, wherein at least one of a first or second combined image forms a portion of a 360 degree panoramic stereoscopic image. (Figure 19, Figure 24 and column 20, lines 62-68 disclose that, through the use of electro-optical lenses to create overlapping images, the system "would therefore be capable of realistic, nearly omnidirectional stereoscopic" image generation of which the first and second combined images would form a portion.)

33. In regards to Claim 48, as best as understood in view of the 35 U.S.C. 112 second paragraph rejection above, McCutchen discloses the imaging system of Claim 8, wherein at least one of a first or second combined image forms a portion of a 360 degree panoramic stereoscopic image. (Figure 19, Figure 24 and column 20, lines 62-68 disclose that, through the use of electro-optical lenses to create overlapping images,

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the system "would therefore be capable of realistic, nearly omnidirectional stereoscopic" image generation of which the first and second combined images would form a portion.)

34. In regards to Claim 49, as best as understood in view of the 35 U.S.C. 112 second paragraph rejection above, McCutchen discloses the imaging system of Claim 9, wherein at least one of a first or second combined image forms a portion of a 360 degree panoramic stereoscopic image. (Figure 19, Figure 24 and column 20, lines 62-68 disclose that, through the use of electro-optical lenses to create overlapping images, the system "would therefore be capable of realistic, nearly omnidirectional stereoscopic" image generation of which the first and second combined images would form a portion.)

35. In regards to Claim 50, as best as understood in view of the 35 U.S.C. 112 second paragraph rejection above, McCutchen discloses the imaging system of Claim 10, wherein at least one of a first or second combined image forms a portion of a 360 degree panoramic stereoscopic image. (Figure 19, Figure 24 and column 20, lines 62-68 disclose that, through the use of electro-optical lenses to create overlapping images, the system "would therefore be capable of realistic, nearly omnidirectional stereoscopic" image generation of which the first and second combined images would form a portion.)

36. In regards to Claim 51, as best as understood in view of the 35 U.S.C. 112 second paragraph rejection above, McCutchen discloses the imaging system of Claim 11, wherein at least one of a first or second combined image forms a portion of a 360 degree panoramic stereoscopic image. (Figure 19, Figure 24 and column 20, lines 62-68 disclose that, through the use of electro-optical lenses to create overlapping images,

the system “would therefore be capable of realistic, nearly omnidirectional stereoscopic” image generation of which the first and second combined images would form a portion.)

37. In regards to Claim 52, as best as understood in view of the 35 U.S.C. 112 second paragraph rejection above, McCutchen discloses the imaging system of Claim 14, wherein the first combined panoramic image and second combined panoramic image form a portion of a 360 degree panoramic stereoscopic image. (Figure 20, column 14, lines 22-25, and column 21, lines 1-13 disclose twelve image capture devices – or camera modules – linked together to cover an entire spherical field of view; Figure 21 and column 21, lines 14-33 disclose the use of six image capture devices – or camera modules – linked together to cover an entire hemisphere; Figure 19, Figure 24 and column 20, lines 62-68 disclose that, through the use of electro-optical lenses to create overlapping images, the system “would therefore be capable of realistic, nearly omnidirectional stereoscopic” image generation of which the first and second combined panoramic images would form a portion.)

38. In regards to Claim 53, as best as understood in view of the 35 U.S.C. 112 second paragraph rejection above, McCutchen discloses the imaging system of Claim 15, wherein the first combined panoramic image and second combined panoramic image display about 360 degrees of a scene. (Figure 20, column 14, lines 22-25, and column 21, lines 1-13 disclose twelve image capture devices – or camera modules – linked together to cover an entire spherical field of view; Figure 21 and column 21, lines 14-33 disclose the use of six image capture devices – or camera modules – linked together to cover an entire hemisphere; Figure 19, Figure 24 and column 20, lines 62-

68 disclose that, through the use of electro-optical lenses to create overlapping images, the system "would therefore be capable of realistic, nearly omnidirectional stereoscopic" image generation of which the first and second combined panoramic images would form a portion.)

39. Claims 19 -21, 29 and 54 are rejected under 35 U.S.C. 102(b) as being anticipated by McCutchen (5,023,725).

40. In regards to Claim 19, McCutchen discloses an imaging system comprising:

- a first image capture device having a first orientation (Figures 2 shows six separate image capture device planes where each image capture device has a distinctly different orientation as exemplified by Item 53 and the plurality of other, unlabeled axis. Figure 3 and column 11, lines 38-51 disclose a hemispherical embodiment of the disclosed invention where six, individual and separately oriented image capture devices are utilized.)
- a second image capture device having a second orientation different from said first orientation (Figures 2 shows six separate image capture device planes where each image capture device has a distinctly different orientation as exemplified by Item 53 and the plurality of other, unlabeled axis. Figure 3 and column 11, lines 38-51 disclose a hemispherical embodiment of the disclosed invention where six, individual and separately oriented image capture devices are utilized and where the

- second image capture device would have a second orientation different from said first orientation.)
- a third image capture device having a third orientation different from said second orientation (Figures 2 shows six separate image capture device planes where each image capture device has a distinctly different orientation as exemplified by Item 53 and the plurality of other, unlabeled axis. Figure 3 and column 11, lines 38-51 disclose a hemispherical embodiment of the disclosed invention where six, individual and separately oriented image capture devices are utilized and where the third image capture device would have a third orientation different from said second orientation.)
  - a fourth image capture device having a fourth orientation different from said third orientation (Figures 2 shows six separate image capture device planes where each image capture device has a distinctly different orientation as exemplified by Item 53 and the plurality of other, unlabeled axis. Figure 3 and column 11, lines 38-51 disclose a hemispherical embodiment of the disclosed invention where six, individual and separately oriented image capture devices are utilized and where the fourth image capture device would have a fourth orientation different from said third orientation.)
  - means for combining a first image captured with said first image capture device with a second image captured with said second image capture

device to produce a first combined image (Figure 24, column 21, lines 51-68 and column 22, lines 1-29 disclose the use of electro-optical lenses to extract three screens within one image capture device wherein each screen covers the area equivalent to one section of a dodecahedrically divided sphere. It is further disclosed that one-third of the captured image, e.g. Item 194 of Figure 24, is overlapping a second image produced by a second image capture device to produce a first combined image.)

- means for combining a third image captured with said third image capture device with a fourth image captured with said fourth image capture device to produce a second combined image (Figure 24, column 21, lines 51-68 and column 22, lines 1-29 disclose the use of electro-optical lenses to extract three screens within one image capture device wherein each screen covers the area equivalent to one section of a dodecahedrically divided sphere. It is further disclosed that one-third of the captured image is overlapping a first adjacent image and another one-third is overlapping a second adjacent image. In the disclosed invention, there are six image capture devices with each image capture device capable of extracting three screens and then overlapping one-third with a first adjacent image and another one-third with a second adjacent image where the third image capture device would overlap a

portion of a third image with a portion of a fourth image captured by a fourth image capture device.)

41. In regards to Claim 20, McCutchen discloses the imaging system of Claim 19, further comprising a means for displaying said first combined image and said second combined image as a stereoscopic image. (Figure 19 and column 20, lines 62-68 disclose that the system, composed of a plurality of combined images, "would therefore be capable of realistic, nearly omnidirectional stereoscopic" image generation.)

42. In regards to Claim 21, as best as understood in view of the 35 U.S.C. 112 rejections contained hereinabove, McCutchen discloses the imaging system of Claim 19, wherein said first combined image displays at least about 180 degrees of a scene (Figure 25 and column 22, lines 32-34 where a single image capture device is disclosed as having a field of view of at least 152 degrees and the combined images would have a field of view greater than 180 degrees of a scene).

43. In regards to Claim 29, as best as understood in view of the claim objections contained hereinabove, McCutchen discloses the imaging system of Claim 21, wherein the overlapping edges of an image in an image buffer are "feathered" by degrading visibility of pixels in an overlap area by means of reducing brightness (column 22, lines 22-29).

44. In regards to Claim 54, as best as understood in view of the 35 U.S.C. 112 rejections and claim objections contained hereinabove, McCutchen discloses the imaging system of Claim 21, wherein said combined image represents about 360 degrees of a scene. (Figure 20, column 14, lines 22-25, and column 21, lines 1-13



disclose twelve image capture devices – or camera modules – linked together to cover an entire spherical field of view; Figure 21 and column 21, lines 14-33 disclose the use of six image capture devices – or camera modules – linked together to cover an entire hemisphere; Figure 19, Figure 24 and column 20, lines 62-68 disclose that, through the use of electro-optical lenses to create overlapping images, the system “would therefore be capable of realistic, nearly omnidirectional stereoscopic” image generation of which the first and second combined panoramic images would form a portion.)

45. Claims 23 and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by McCutchen (5,023,725).

46. In regards to Claim 23, McCutchen discloses a method for producing a stereoscopic image comprising:

- obtaining a first image, obtaining a second image, obtaining a third image (Figures 2 shows six separate image capture device planes; Figure 20, column 14, lines 22-25, and column 21, lines 1-13 disclose a method wherein twelve image capture devices – or camera modules – linked together are able to generate images covering an entire spherical field of view; Figure 21 and column 21, lines 14-33 discloses a method wherein six image capture devices – or camera modules – linked together are able to generate images covering an entire hemisphere)
- combining a first portion of said first image with a portion of said second image to produce a first combined image (Figure 24, column 21, lines 51-68 and column 22, lines 1-29 disclose the use of electro-optical lenses to

extract three screens with each one of five image capture devices

wherein each screen covers the area equivalent to one pentagon-shaped section of a dodecahedrically divided sphere. It is further disclosed that one-third, e.g. Item 194 of Figure 24, of the captured image is overlapping a second image producing a first combined image.)

- combining a second portion of said first image with a portion of said third image to produce a second combined image (Figure 24, column 21, lines 51-68 and column 22, lines 1-29 disclose the use of electro-optical lenses to extract three screens with each one of five image capture devices wherein each screen covers the area equivalent to one pentagon-shaped section of a dodecahedrically divided sphere. It is further disclosed that another one-third, e.g. Item 195 of Figure 24, of the captured image is overlapping a third image producing a second combined image.)
- displaying said first combined image and said second combined image in a manner which produces a stereoscopic image (Figure 31 shows the schematic of a display system capable of producing stereoscopic imagery; column 19, lines 40-47, lines 53-65 and column 20, lines 65-69 discuss the overlapping of images to create three-dimensional qualities, i.e., stereoscopic images.)

47. In regards to Claim 24, McCutchen discloses the method of Claim 23, further comprising picking up said first image, said second image, and said third image from a

plurality of points defining an arcuate line. (Figures 1 and 2 disclose a sphere divided into twelve, pentagon-shaped planes where, in the recessed region defined by the planar elements created by the points of the pentagon, lies an image capture device. Figure 3 and column 11, lines 21-51 disclose the image capture devices being set arcuately relative to one another within the spherical system.)

48. Claims 30-32, 34, 35, 37, 39, and 56 are rejected under 35 U.S.C. 102(b) as being anticipated by McCutchen (5,023,725).

49. In regards to Claim 30, McCutchen discloses an imaging system comprising:

- a first image capture unit to capture a first image, a second image capture unit to capture a second image, a third image capture unit to capture a third image (Figures 2 shows six separate image capture device planes; Figure 21 and column 21, lines 14-33 disclose the use of six image capture devices – or camera modules – linked together to cover an entire hemisphere by means of each image capture unit capturing a slightly different image; Figure 20, column 14, lines 22-25, and column 21, lines 1-13 disclose twelve image capture devices – or camera modules – linked together to cover an entire spherical field of view by means of each image capture unit capturing a slightly different image.)
- a processing unit operationally coupled to the first, second, and third image capture units to receive the first, the second, and the third images (Figures 7 and 9 disclose the processing unit, in the form of a masking

processor, and its relationship to the individual image capture units;

Figure 31 discloses the masking processor in relationship to multiple image capture units; column 15, lines 32-38 disclose the masking processor as being responsible for combining images), wherein:

- a first portion of the first image can be combined with a portion of the second image to provide a first combined image (Figure 24, column 21, lines 51-68 and column 22, lines 1-29 disclose the use of electro-optical lenses to extract three screens within each one of five image capture devices wherein each screen covers the area equivalent to one pentagon-shaped section of a dodecahedrically divided sphere. It is further disclosed that one-third, e.g. Item 194 of Figure 24, of the captured image is overlapping a second image producing a first combined image.)
- a second portion of the first image can be combined with a portion of the third image to provide a second combined image (Figure 24, column 21, lines 51-68 and column 22, lines 1-29 disclose the use of electro-optical lenses to extract three screens within each one of five image capture devices wherein each screen covers the area equivalent to one pentagon-shaped section of a dodecahedrically divided sphere. It is further disclosed that another one-third, e.g. Item 195 of Figure 24, of the captured image is overlapping a third image producing a second combined image.)

- the first and second combined images can be displayed to provide a stereoscopic image (column 20, lines 65-69 disclose the ability of the display system to create "realistic, nearly omnidirectional stereoscopic" images)

50. In regards to Claim 31, McCutchen discloses the imaging system of Claim 30, wherein said first, the second, and the third image capture units are located approximately equidistant from each other (Figure 2 demonstrates the equidistant layout of the image capture units; Figure 31, column 25, lines 60-69 and column 26, lines 1-13 disclose the dimensions of the units relative to one other) along a substantially arcuate path (Figures 2, 3, 4, 19, 20, 31 and column 11, lines 52-57 disclose the imaging system as having a substantially rounded shape around which the image capture devices are placed.)

51. In regards to Claim 32, McCutchen discloses the imaging system of Claim 31, wherein said substantially arcuate path is defined by a substantially spherical body. (Figures 2, 3, 4, 19, 20, 31 and column 11, lines 52-57 disclose the imaging system as having a substantially spherical body around which the image capture devices are placed.)

52. In regards to Claim 34, McCutchen discloses the imaging system of Claim 30, wherein a field of view associated with said first image capture unit overlaps a field of view associated with said second image capture unit by an overlap amount (Figure 24, column 21, lines 51-68 and column 22, lines 1-29 disclose the use of electro-optical lenses to extract three screens within one image capture device wherein each screen

covers the area equivalent to one section of a dodecahedrically divided sphere. It is disclosed that one-third of the captured image, e.g. Item 194 of Figure 24, is overlapping a first adjacent image), and wherein the field of view associated with said second image capture unit overlaps a field of view associated with said third image capture unit by the overlap amount. (Figure 24, column 21, lines 51-68 and column 22, lines 1-29 further disclose that each of the five adjacent image capture devices have the same characteristics, i.e., each image capture device is capable of extracting three screens and then overlapping one-third with a first adjacent image and another one-third with a second adjacent image. In other words, one-third of the image from the first image capture device would overlap a field of view of a second image capture device and one-third of the images from the second image capture device would overlap the field of view of a third image capture device.)

53. In regards to Claim 35, McCutchen discloses the imaging system of Claim 34, wherein the overlap amount is about 10 percent to about 90 percent. (Figure 24, column 21, lines 51-68 and column 22, lines 1-29 disclose the overlap amount as one-third, or 33 percent, of the image.)

54. In regards to Claim 37, McCutchen discloses the imaging system of Claim 30, wherein said first portion of said first image is between about 20 percent and about 80 percent of said first image (Figure 24, column 21, lines 51-68 and column 22, lines 1-29 disclose the first portion of the first image, which overlaps the second image, as one-third, or 33 percent, of the image), and wherein said portion of said second image is between about 20 percent and about 80 percent of said second image (Figure 24,

column 21, lines 51-68 and column 22, lines 1-29 disclose the portion of the second image, which is overlapped by the portion of the first image, as one-third, or 33 percent, of the image).

55. In regards to Claim 39, McCutchen discloses the imaging system of Claim 30, wherein the first combined image is combined with a sufficient plurality of images to produce a first combined panoramic image, representing about 90 degrees of a scene, and wherein the second combined image is combined with a sufficient plurality of other images to produce a second combined panoramic image, representing about 90 degrees of the scene (column 24, lines 40-44 and column 20, lines 65-69 disclose that, "with each lens being electro-optical and used to create overlapping images, such a camera would therefore be capable of realistic, nearly omnidirectional stereoscopic photography" where omnidirectional can be defined as panoramic and, when a sufficient plurality of images are combined, can achieve "a maximum field of view of 91.6% of a sphere" wherein the overlapped portion is about 90 degrees of a scene), and wherein said first combined panoramic image and said second combined panoramic image are displayed to provide a stereoscopic, panoramic image (column 19, lines 40-52 disclose the ability of the system to display stereoscopic images; Figure 25 and column 22, lines 32-34 where a single image capture device is disclosed as having a field of view of at least 152 degrees and the combined panoramic image would be greater than 180 degrees of a scene.)

56. In regards to Claim 56, McCutchen discloses the imaging system of Claim 30, wherein said stereoscopic, panoramic image forms a portion of a 360 degree panoramic

stereoscopic image (column 11, lines 26-30 disclose the ability of the system to capture a full hemispherical field of view wherein the stereoscopic, panoramic images, disclosed hereinabove, form a portion).

57. Claim 41, as best as understood in view of the U.S.C. 112 first paragraph rejection contained hereinabove, and its dependent Claims 42-46 and 57-58 are rejected under 35 U.S.C. 102(b) as being anticipated by McCutchen (5,023,725).

58. In regards to Claim 41, McCutchen discloses an imaging system comprising:

- an image capture unit to provide an image (Figures 2 shows six separate image capture device planes; Figure 21 and column 21, lines 14-33 disclose the use of six image capture devices – or camera modules – linked together to cover an entire hemisphere by means of each image capture unit capturing a slightly different image; Figure 20, column 14, lines 22-25, and column 21, lines 1-13 disclose twelve image capture devices – or camera modules – linked together to cover an entire spherical field of view by means of each image capture unit capturing a slightly different image.)
- a processing unit coupled to the image capture unit (Figures 7 and 9 disclose the processing unit, in the form of a masking processor, and its relationship to the individual image capture units; Figure 31, disclose the masking processor in relationship to multiple image capture units; column 15, lines 32-38 disclose the masking processor as being responsible for combining images) to:



- receive a first portion of said image (Figure 24, column 21, lines 51-68 and column 22, lines 1-29 disclose the use of electro-optical lenses to divide an image into three pentagon-shaped portions where the first portion would be one of the these shapes such as that shown in Item 194 of Figure 24.)
- receive a second portion of said image (Figure 24, column 21, lines 51-68 and column 22, lines 1-29 disclose the use of electro-optical lenses to divide an image into three pentagon-shaped portions where the second portion would be one of the these shapes such as that shown in Item 195 of Figure 24.)

59. In regards to Claim 42, McCutchen discloses the imaging system of Claim 41 as best as understood in view of the 35 U.S.C. 112 first paragraph rejection contained hereinabove, wherein said first stereoscopic image and said second stereoscopic image are combined into a panoramic stereoscopic image (column 19, lines 40-52 disclose the ability of the system to produce stereoscopic images; Figure 25 and column 22, lines 32-34 where a single image capture device is disclosed as having a field of view of at least 152 degrees and the combined images would have a field of view greater than 180 degrees of a scene; column 24, lines 40-44 and column 20, lines 65-69 disclose that, "with each lens being electro-optical and used to create overlapping images, such a camera would therefore be capable of realistic, nearly omnidirectional stereoscopic photography").

60. In regards to Claim 43, McCutchen discloses the imaging system of Claim 41 as best as understood in view of the 35 U.S.C. 112 first paragraph rejection contained hereinabove, further comprising a plurality of image capture units coupled to the processing unit (Figures 7 and 31 as well as column 14, lines 58-64 disclose the image capture units coupled to a projection system in which the masking processor performs the functional equivalent of the processing unit claimed by applicant), the plurality of image capture units to provide a plurality of images (Figure 2 shows six separate image capture device planes; Figure 21 and column 21, lines 14-33 disclose the use of six image capture devices – or camera modules – linked together to cover an entire hemisphere by means of each image capture unit capturing a slightly different image; Figure 20, column 14, lines 22-25, and column 21, lines 1-13 disclose twelve image capture devices – or camera modules – linked together to cover an entire spherical field of view by means of each image capture unit capturing a slightly different image), wherein selected ones of the plurality of images are combined with at least one other image to produce a plurality of combined images (Figure 24, column 21, lines 51-68 and column 22, lines 1-29 disclose the use of electro-optical lenses to extract three screens within each one of five image capture devices wherein each screen covers the area equivalent to one pentagon-shaped section of a dodecahedrically divided sphere. It is further disclosed that one-third, e.g. Item 194 of Figure 24, of the captured image is overlapping a second image producing a first combined image and another one-third, e.g. Item 195 of Figure 24, of the captured image is overlapping a second image producing a second combined image), wherein the plurality of combined images are

combined to provide a first panoramic image and a second panoramic image, and wherein the first panoramic image and the second panoramic image are combined to provide a panoramic, stereoscopic image (column 24, lines 40-44 and column 20, lines 65-69 disclose that, "with each lens being electro-optical and used to create overlapping images, such a camera would therefore be capable of realistic, nearly omnidirectional stereoscopic photography" and, when a sufficient plurality of images are combined, can achieve "a maximum field of view of 91.6% of a sphere").

61. In regards to Claim 44, McCutchen discloses the imaging system of Claim 43 as best as understood in view of the 35 U.S.C. 112 first paragraph rejection contained hereinabove, wherein said first panoramic image displays about 90 degrees of a scene. (Figure 25 and column 22, lines 32-34 disclose a single image capture device as having a field of view of at least 152 degrees and wherein the overlapping portion of the combined image would display about 90 degrees of a scene.)

62. In regards to Claim 45, McCutchen discloses the imaging system of Claim 43 as best as understood in view of the 35 U.S.C. 112 first paragraph rejection contained hereinabove, wherein said panoramic, stereoscopic image displays about 180 degrees of a scene. (Figure 25 and column 22, lines 32-34 disclose a single image capture device as having a field of view of at least 152 degrees and wherein the combined images would have field of view about 180 degrees of a scene; Figure 21 and column 21, lines 14-33 disclose the use of multiple image capture devices having overlapped images to create panoramic, stereoscopic image displays such that they would cover an entire hemisphere or about 180 degrees.)

63. In regards to Claim 46, McCutchen discloses the imaging system of Claim 41 as best as understood in view of the 35 U.S.C. 112 first paragraph rejection contained hereinabove, further comprising an imaging unit coupled to the processing unit.

(Figures 19, 20, and 21 disclose the imaging unit which is the composition of multiple image capture devices in a single body; Figure 19, Item 176 and column 20, lines 46-52 disclose the cabling connecting the imaging unit to the processing unit; Figure 7 and column 14, lines 28-37 disclose the cabling of the image capture devices connecting the imaging unit to the processing unit.)

64. In regards to Claim 57, McCutchen discloses the imaging system of Claim 42 as best as understood in view of the 35 U.S.C. 112 first paragraph rejection contained hereinabove, wherein said panoramic stereoscopic image forms a portion of a 360 degree panoramic stereoscopic image. (Column 24, lines 40-44 and column 20, lines 65-69 disclose that, in a system having multiple lenses forming panoramic stereoscopic imaging wherein "each lens being electro-optical and used to create overlapping images, such a camera would therefore be capable of realistic, nearly omnidirectional stereoscopic photography" and, when a sufficient plurality of images are combined, can achieve "a maximum field of view of 91.6% of a sphere" of which the individual panoramic, stereoscopic images would form a portion.)

65. In regards to Claim 58, McCutchen discloses the imaging system of Claim 43 as best as understood in view of the 35 U.S.C. 112 first paragraph rejection contained hereinabove, wherein said panoramic, stereoscopic image displays about 360 degrees of a scene. (Column 24, lines 40-44 and column 20, lines 65-69 disclose that, in a

system having multiple lenses forming panoramic stereoscopic imaging wherein "each lens being electro-optical and used to create overlapping images, such a camera would therefore be capable of realistic, nearly omnidirectional stereoscopic photography" and, when a sufficient plurality of images are combined, can achieve "a maximum field of view of 91.6% of a sphere.")

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

66. Claims 25-26, 28 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCutchen (5,023,725) in view of McCutchen (6,141,034).

67. In regards to Claim 25, McCutchen (5,023,725) discloses the method of Claim 24, including the ability of the imaging system to acquire a first image, a second image, and a third image from a plurality of points defining an arcuate line. McCutchen (5,023,725) does not disclose the plurality of points being greater than about five degrees apart and less than about forty-five degrees apart. McCutchen (6,141,034) discloses a set of ten image capture devices spaced equally along an arcuate line where the cameras are approximately thirty-six degrees from one another (Figure 55, column 9, lines 31-33 and column 55, lines 11-20 disclose the cameras lying equally spaced in a single equatorial plane) which is a distance greater than about five degrees

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apart and less than about forty-five degrees apart. It would have been obvious to one skilled in the art at the time the invention was made to combine the teachings of McCutchen (5,023,725) with McCutchen (6,141,034) to achieve a method of acquiring multiple images from a plurality of points having a displacement from one another between five and forty-five degrees for greater resolution in a stereoscopic panoramic recording and display system.

68. In regards to Claim 26, McCutchen (5,023,725) discloses the method of Claim 24, including the ability of the imaging system to acquire a first image, a second image, and a third image from a plurality of points defining an arcuate line. McCutchen (5,023,725) does not disclose the plurality of points being greater than about ten degrees apart and less than about twenty degrees apart. McCutchen (6,141,034) discloses a plurality of image capture devices spaced equally along an arcuate line, in this case ten cameras placed evenly with a spacing of approximately thirty-six degrees from one another along an arcuate line (Figure 55, column 9, lines 31-33 and column 55, lines 11-20 disclose the cameras lying equally spaced in a single equatorial plane). In the specification provided by applicant, there appears to be no disclosed criticality to the degree of spacing other than the fact that a predetermined number of cameras are spaced evenly along the arcuate line. Thus, the number of image capture devices used appears to be a design choice and the angle of spacing between the image capture devices is therefore a natural product of the number of cameras used and, in the case of a spacing of between 10 and 20 degrees, would require the use of between 18 and 36 cameras. It would have been obvious to one skilled in the art at the time the

invention was made to integrate the teachings of McCutchen (5,023,725) with McCutchen (6,141,034) to achieve a method of acquiring multiple images from a plurality of points having a displacement from one another between ten and twenty degrees for greater resolution in a stereoscopic panoramic recording and display system.

69. In regards to Claim 28, as best as understood in view of the 35 U.S.C. 112 second paragraph rejection contained hereinabove, McCutchen (5,023,725) discloses the method of Claim 26, including the ability of the imaging system to acquire a first image, a second image, and a third image from a plurality of points defining an arcuate line and produce a stereoscopic image representing at least about 180 degrees of a scene. McCutchen (5,023,725) does not disclose the plurality of points being greater than about ten degrees apart and less than about twenty degrees apart. McCutchen (6,141,034) discloses a plurality of image capture devices spaced equally along an arcuate line, in the disclosed example there are ten cameras placed evenly along the arcuate line with a resultant spacing of approximately thirty-six degrees from one another (Figure 55, column 9, lines 31-33 and column 55, lines 11-20 disclose the cameras lying equally spaced in a single equatorial plane). In the specification provided by the applicant, there appears to be no disclosed criticality to the degree of spacing other than the fact that a predetermined number of cameras are spaced evenly along an arcuate line such as disclosed by McCutchen. It would have been obvious to one skilled in the art at the time the invention was made to integrate the teachings of McCutchen (5,023,725) with McCutchen (6,141,034) to achieve a method of acquiring

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multiple images from a plurality of points having a displacement from one another between ten and twenty degrees and which would represent at least about 180 degrees of a scene for greater resolution in a stereoscopic panoramic recording and display system.

70. In regards to Claim 33, McCutchen (5,023,725) discloses the imaging system of Claim 30, including the imaging system having a first, second, and third image capture devices separated from each other by an angular distance along an arc. McCutchen (5,023,725) does not disclose the angular distance between the first and second image capture devices as being about 5 degrees to about 45 degrees. McCutchen (6,141,034) discloses a set of ten image capture devices spaced equally along an arcuate line where the first and second image capture devices are approximately thirty-six degrees from one another (Figure 55, column 9, lines 31-33 and column 55, lines 11-20 disclose the cameras lying equally spaced in a single equatorial plane, column 54, lines 43-44 disclose the rotational distance between cameras as thirty-six degrees) which is a distance greater than about five degrees apart and less than about forty-five degrees apart. It would have been obvious to one skilled in the art at the time the invention was made to combine the teachings of McCutchen (5,023,725) with McCutchen (6,141,034) to achieve a method of acquiring multiple images from multiple image capture devices spaced along an arc and having a displacement from one another between five and forty-five degrees for greater resolution in a stereoscopic panoramic recording and display system.



71. In regards to Claim 36, McCutchen (5,023,725) discloses the imaging system of Claim 30, wherein a defined image plane associated with said first image capture unit overlaps a defined image plane associated with said second image capture unit. McCutchen (5,023,725) does not disclose the amount of overlap as "by about 1 to about 20 percent." McCutchen (6,141,034) discloses an imaging system where single-pentagon shaped images are overlapped (column 36, lines 20-26 discloses the transition zone, or overlap, may be of "whatever width may be desirable"). This suggestion would include the range of 1-20% as claimed since the overlap amount is a standard design parameter and there is no disclosed criticality of this range. It would have been obvious to one skilled in the art at the time the invention was made to integrate the teachings of McCutchen (5,023,725) with McCutchen (6,141,034) to achieve a system having images with a percentage of overlap between 1 and 20 percent so as to have a transition zone between images providing an apparently seamless view of an scene.

72. In regards to Claim 55, McCutchen (5,023,725) discloses the imaging system of Claim 30, wherein the first and second combined images are combined with a sufficient plurality of images to produce panoramic, stereoscopic images. McCutchen (5,023,725) also discloses the imaging system capable of combining images for a single panoramic, monoscopic image (Figure 3, column 11, lines 42-44 and column 5, lines 3-9 disclose the monoscopic image generation by which each pentagon-shaped image is aligned end-to-end to form a panoramic field of view). McCutchen (5,023,725) does not disclose the ability of the system to generate a first and second combined monoscopic,

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panoramic image that, when displayed together, provides a stereoscopic, panoramic image. McCutchen (6,141,034) discloses an imaging system capable of generating a first combined panoramic image representing a 360 degree panoramic monoscopic image (column 35, lines 31-38 disclose the use of twelve cameras to generate single-pentagon shaped images which, when added together in the form of a monoscopic image, can cover an entire sphere or a 360 degree panoramic image), and wherein the second combined image is combined with a sufficient plurality of other images to produce a second combined panoramic image, representing a 360 degree panoramic monoscopic image (column 51, lines 43-55 disclose a variation of the single-pentagon system as described in column 35, lines 31-38 wherein the first set of panoramic, monoscopic images are generated followed by a rotation of the camera and a second exposure of the scene to generate a second combined panoramic monoscopic image representing 360 degrees of an image), and wherein said first combined panoramic image and said second combined panoramic image are displayed to provide a stereoscopic, panoramic image (column 51, lines 43-55 further disclose the ability of this technique to generate a stereoscopic, panoramic image through the combination of the first set of combined images and the second set of combined images). It would have been obvious to one skilled in the art at the time the invention was made to integrate the teachings of McCutchen (5,023,725) with McCutchen (6,141,034) and display two sets of combined images in such a manner as to achieve an imaging system capable of generating stereoscopic, panoramic images having the illusion of three-dimensional space.

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73. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over McCutchen (5,023,725) in view of Chen ("Landscape Generation: A Changing Perspective," excerpted from *ESD: The Electronic System Design Magazine*).

74. In regards to Claim 38, McCutchen (5,023,725) discloses the imaging system of Claim 30, wherein a plurality of said first and said second combined images are generated and displayed. McCutchen does not disclose the display of the combined images in sequence to convey motion. Chen discloses an image generation system wherein images are manipulated and displayed sequentially to convey motion (paragraph 2, sentences 3-4 state "the photograph...is stretched, skewed, rotated, and translated. This process is continuous at 1/60-sec frame time under computer control and allows smooth translation of photographs corresponding to...motion"). It would have been obvious to one skilled in the art at the time the invention was made to integrate the teachings of McCutchen with Chen to achieve an imaging system capable of displaying a series of combined images in such a manner as to convey motion in order to present a more realistic image to a viewer.

75. Claims 16, 17, 27, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCutchen (5,023,725) in view of McCutchen (6,141,034) and in further view of Uyttendaele (6,559,846).

76. In regards to Claim 16, McCutchen (5,023,725) discloses the imaging system of Claim 14, further comprising displaying a first set of combined panoramic images and a second set of combined panoramic images (column 16, lines 33-36 disclose the ability of the system to combine images for display; column 24, lines 40-44 and column 20,

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lines 65-69 disclose that, "with each lens being electro-optical and used to create overlapping images, such a camera would therefore be capable of realistic, nearly omnidirectional stereoscopic photography" where omnidirectional can be defined as panoramic). While McCutchen (5,023,725) does disclose the system as being used for "motion picture film" (column 10, lines 55-66), he does not specifically disclose the ability of the system to display sets of images sequentially in a manner which produces a succession of visual information. McCutchen (6,141,034) discloses improvements upon the imaging system of McCutchen (5,023,725) such that other imaging devices may be used, including sequential still panoramic photography (column 3, lines 26-27) and video cameras (abstract; column 3, lines 58-60; column 2, lines 39-67 and column 3, lines 1-8 disclose the interchangeability of the various imagery systems such that still images can be transferred from still photography to video and vice versa). McCutchen (6,141,034) does not specifically state the video system as capable of presenting images in succession in such a way as to produce a succession of visual information. Uyttendaele states "panoramic video is a video made up of a sequence of panoramic frames depicting a surrounding scene" (column 1, lines 16-17; It is further noted that Uyttendaele discusses McCutchen (6,141,034) in that same section as part of his disclosure on background art). It would have been obvious to one skilled in the art at the time the invention was made to integrate the teachings of McCutchen, McCutchen and Uyttendaele to achieve a panoramic imaging system by displaying sets of combined panoramic images in a sequential manner to produce a succession of visual information for greater realism in the imagery.

77. In regards to Claim 17, McCutchen discloses the imaging system of Claim 14, further comprising the ability to display a first set of combined panoramic images and a second set of combined panoramic images (column 16, lines 33-36 disclose the ability of the system to combine images for display; column 24, lines 40-44 and column 20, lines 65-69 disclose that, "with each lens being electro-optical and used to create overlapping images, such a camera would therefore be capable of realistic, nearly omnidirectional stereoscopic photography" where omnidirectional can be defined as panoramic). While McCutchen (5,023,725) does disclose the system as being used for "motion picture film" (column 10, lines 55-66), McCutchen (5,023,725) does not specifically disclose the ability of the system to display sets of images sequentially in a manner which produces a stereoscopic panoramic motion image. McCutchen (6,141,034) discloses improvements upon the imaging system of McCutchen (5,023,725) such that other imaging devices may be used, including sequential still panoramic photography (column 3, lines 26-27) and video cameras (abstract; column 3, lines 58-60; column 2, lines 39-67 and column 3, lines 1-8 disclose the interchangeability of the various imagery systems such that still images can be transferred to video and vice versa). While McCutchen (6,141,034) does disclose the system as capable of stereoscopic panoramic motion image (column 2, lines 39-67 and column 3, lines 1-8), McCutchen (6,141,034) does not specifically state the video system as capable of presenting images in succession. Uyttendaele states "panoramic video is a video made up of a sequence of panoramic frames depicting a surrounding scene" (column 1, lines 16-17; It is further noted that Uyttendaele discusses McCutchen

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(6,141,034) in that same section as part of his disclosure on background art.). It would have been obvious to one skilled in the art at the time the invention was made to integrate the teachings of McCutchen, McCutchen and Uyttendaele to achieve a panoramic, stereoscopic imaging system by displaying sets of combined panoramic images in a sequential manner so as to produce a stereoscopic panoramic motion image for greater realism in the imagery.

78. In regards to Claim 27, McCutchen (5,023,725) discloses the method of Claim 23; further comprising displaying a first plurality of combined images (column 16, lines 33-36 disclose the ability of the system to combine images for display) and a second plurality of combined images (column 16, lines 33-36 disclose the ability of the system to combine images for display) to produce a stereoscopic motion image (column 16, lines 33-36 disclose the ability of the system to combine images for display; column 24, lines 40-44 and column 20, lines 65-69 disclose that, "with each lens being electro-optical and used to create overlapping images, such a camera would therefore be capable of realistic, nearly omnidirectional stereoscopic photography" where omnidirectional can be defined as panoramic; column 10, lines 55-66 disclose the system being used for "motion picture film"). McCutchen (5,023,725) does not disclose the first and second plurality of combined images be displayed in sequence.

McCutchen (6,141,034) discloses improvements upon the imaging system of McCutchen (5,023,725) such that other imaging devices may be used, including sequential still panoramic photography (column 3, lines 26-27) and video cameras (abstract; column 3, lines 58-60; column 2, lines 39-67 and column 3, lines 1-8 disclose

the interchangeability of the various imagery systems such that still images can be transferred to video and vice versa). McCutchen (6,141,034) does not specifically state the video system as capable of presenting images in succession. Uyttendaele states "panoramic video is a video made up of a sequence of panoramic frames depicting a surrounding scene" (column 1, lines 16-17; It is further noted that Uyttendaele discusses McCutchen (6,141,034) in that same section as part of his disclosure on background art.). It would have been obvious to one skilled in the art at the time the invention was made to integrate the teachings of McCutchen, McCutchen and Uyttendaele to achieve an imaging system capable of displaying sets of combined images in sequence so as to produce a stereoscopic motion image for greater realism in the imagery.

79. In regards to Claim 40, McCutchen (5,023,725) discloses the imaging system of Claim 39, wherein a set of first combined panoramic images (column 16, lines 33-36 disclose the ability of the system to combine images for display; column 24, lines 40-44 and column 20, lines 65-69 disclose that, "with each lens being electro-optical and used to create overlapping images, such a camera would therefore be capable of realistic, nearly omnidirectional stereoscopic photography" where omnidirectional can be defined as panoramic) and a set of second combined panoramic images (column 16, lines 33-36 disclose the ability of the system to combine images for display; column 24, lines 40-44 and column 20, lines 65-69 disclose that, "with each lens being electro-optical and used to create overlapping images, such a camera would therefore be capable of realistic, nearly omnidirectional stereoscopic photography" where omnidirectional can be defined as panoramic) are displayed. While McCutchen (5,023,725) does disclose

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the system as being used for "motion picture film" (column 10, lines 55-66), McCutchen (5,023,725) does not specifically disclose the ability of the system to display sets of images sequentially in a manner which produces a moving stereoscopic panoramic image. McCutchen (6,141,034) discloses improvements upon the imaging system of McCutchen (5,023,725) such that other imaging devices may be used, including sequential still panoramic photography (column 3, lines 26-27) and video cameras (abstract; column 3, lines 58-60; column 2, lines 39-67 and column 3, lines 1-8 disclose the interchangeability of the various imagery systems such that still images can be transferred to video and vice versa). McCutchen (6,141,034) does not specifically state the video system as capable of presenting images in succession. Uyttendaele states "panoramic video is a video made up of a sequence of panoramic frames depicting a surrounding scene" (column 1, lines 16-17; It is further noted that Uyttendaele discusses McCutchen (6,141,034) in that same section as part of his disclosure on background art.). It would have been obvious to one skilled in the art at the time the invention was made to integrate the teachings of McCutchen, McCutchen and Uyttendaele to achieve an imaging system capable of displaying sets of combined images in sequence so as to produce a moving stereoscopic, panoramic image for greater realism in the imagery.

### ***Conclusion***

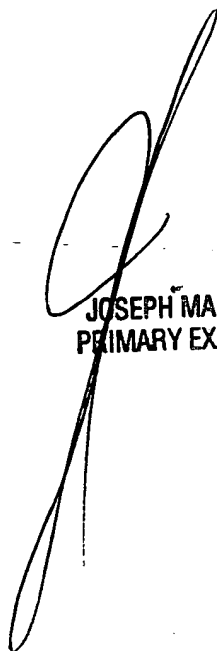
80. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alysa N. Brautigam whose telephone number is 703-305-8631. The examiner can normally be reached on 8:00 am - 4:30 pm.



If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso can be reached on 703-305-3885. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

anb



JOSEPH MANCUSO  
PRIMARY EXAMINER